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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the relay welding process of band steel. The comparison section with the front end section of the band steel which carries out backward to the back end section of the band steel preceded especially is formed aslant, and it is related with the relay welding process of the band steel which carries out the seam welding of this comparison section.

[0002]

[Description of the Prior Art] It is necessary to supply an ingredient continuously on Rhine in roll formation Rhine and a press line. Usually, after beginning to roll the charge of a coil strip, sending out an ingredient to up to Rhine and completing one coil of this charge of a coil strip from an uncoiler, it welds to the charge of a coil strip of precedence of the following charge of a coil strip (relay welding), and the approach of supplying continuously is adopted.

[0003] As this relay welding process, after comparing the back end section of current and precedence material, and the front end section of backward material, the approach of welding by TIG arc welding, spot welding, etc. is used. By the conventional approach, since the back end section of precedence material and the front end section of backward material were mutually compared in the perpendicular end face as shown in drawing 1 - drawing 3, the weld time was long and needed the bead processing after welding. Furthermore, the actual condition is that skill is needed for a coil edge melting, and there being also problems, such as omission (drawing 4), and welding.

[0004] Moreover, the galvanized ingredient was not able to be welded in TIG arc welding.

[0005] Then, the seam welding which does not need skill but can weld it to the galvanized ingredient is adopted. However, since the seam welding of the part which piled up the ingredient of the same thickness is carried out and the weld became thick conventionally, there was a problem that applicability will be limited even to the ingredient whose board thickness is 0.4 mm extent.

[0006]

[Problem(s) to be Solved by the Invention] The weld time is short and does not need the bead processing after welding, it melts, omission etc. does not occur, and welding conditions, such as an ingredient and board thickness, are not limited, but it can automate, and this invention aims at offering the band steel relay welding process which can be welded easily.

[0007]

[Means for Solving the Problem] According to this invention, the band steel relay welding process characterized by having the welding side formation process which forms the slanting welding side which ****s in the back end section of the band steel to precede and the front end section of band steel which carries out backward mutually, and the seam welding process which compares this welding side and carries out the seam welding of the comparison section is offered.

[0008] As for said welding side formation process, it is desirable to have the cutting process which cuts aslant the direction of the board width and the direction of board thickness of band steel.

[0009] Moreover, as for said welding side formation process, it is desirable to have a process in the

direction cutting process of the board width of cutting the direction of the board width of band steel aslant, and the direction of board thickness of band steel, the board thickness direct pressure total which performs rolling processing.

[0010] It is desirable to cut the direction of the board width of band steel acutely in said direction cutting process of the board width, and cutting especially at 45 degrees is still more desirable.

[0011]

[Function] Since the slanting welding side which ****s in the back end section of the band steel to precede and the front end section of band steel which carries out backward mutually is formed according to the band steel relay welding process of this invention, the comparison section of a both-ends welding side can be made large. Since a slanting welding side is furthermore formed not only in the direction of the board width but in the direction of board thickness, this comparison section will have the superposition part of thin meat.

[0012] Therefore, it compares and the conventionally impossible seam welding to the section becomes possible. Moreover, by performing seam welding to this large comparison section, welding becomes easy and the weld time can be shortened. Moreover, since this comparison section is compared in the direction of slant, in case it welds, a coil edge melts and omission does not produce it.

[0013]

[Example] Hereafter, although this invention is explained to a detail with reference to a drawing, this invention is not limited to this.

[0014] The weld of the band steel welded to drawing 5 - drawing 7 by the band steel relay welding process of this invention is shown. Here, the back end section 11 of the band steel to precede and the front end section 12 of the band steel which carries out backward have the slanting welding side which ****s mutually, the seam welding of the welded band steel 10 is carried out in respect of this welding, and it is obtained. The weld of the back end section 11 and the front end section 12 is formed in the configuration which inclined so that the directions of the board width and the directions of board thickness of the configuration 11 and 12 which ****s mutually, i.e., both ends, might overlap mutually.

[0015] Next, the band steel relay welding process of this invention is explained concretely.

[0016] Drawing 8 is this schematic drawing of one example which applied the band steel relay approach of this invention to roll formation Rhine etc. Band steel 1 begins to be rolled from an uncoiler 2, and is supplied to roll formation Rhine or a press line 3. After one coil of band steel 1 is completed, it is sent to Rhine which one coil of following band steel 1' begins to be equipped with and wound around an uncoiler 2, and consists of the welding side formation part 20, a seam welding part 30, and a welding after-treatment part 40. That is, the back end section 11 of the band steel 1 to precede and the front end section 12 of band steel 1' which carries out backward are formed in the slanting welding side which ****s mutually in the welding side formation part 20 (welding side formation process), subsequently the seam welding of the welding side is carried out in the seam welding section 30 (seam welding process), and an excessive coil edge is continuously cut in the welding after-treatment part 40. In this way, band steel 1 and 1' are welded, and become band steel 10, and roll formation Rhine or a press line 3 will be supplied continuously, without being intermittent.

[0017] One embodiment of the welding side formation process used for the band steel relay approach of this invention at drawing 9 and drawing 10 is shown. This welding side formation process is performed in the welding side formation part 20 in drawing 8. the vertical clamps 21 and 22 to which this welding side formation part 20 supports band steel 1, and the disc-like cutting edge 23 -- this -- the slide equipment 25 which supports the support shaft 24 and this support shaft 24 which support a cutting edge 23 pivotable possible [a reciprocating motion] is included. As shown in drawing 10, to the vertical clamps 21 and 22, said slide equipment 25 is isolated and is arranged in parallel, and among both, the disc-like cutting edge 23 and the support shaft 24 are established possible [a reciprocating motion].

[0018] A cutting edge 23 contacts the side face of the vertical clamps 21 and 22, and cuts the edge 11 of band steel 1, or 12 along with this clamp. The side face of these vertical clamps 21 and 22 inclines toward the inferior surface of tongue of the bottom clamp 22 from the top face of the upper clamp 21, and specifies the cutting locus of the direction of board thickness. Therefore, while a cutting edge 23

contacts aslant to the direction of board thickness of band steel 1, the vertical clamps 21 and 22 are arranged up and down so that the direction of board thickness of band steel 1 may be pinched, so that the direction of board thickness may be cut. Moreover, while a cutting edge 23 contacts aslant to the direction of the board width of band steel 1, the vertical clamps 21 and 22 are arranged in the slanting crossing direction on band steel 1 so that the direction of the board width may be reciprocated with slide equipment 25. In order to form the slanting welding side which ****s mutually to the direction of board thickness and the direction of the board width of the band steel 1 to precede and band steel which carries out backward 1', as for the include angle to which a cutting edge 23 crosses band steel in the direction of board thickness, and the direction of the board width, it is desirable respectively that it is an acute angle, and it is desirable that it is especially 45 degrees.

[0019] As mentioned above, since said slide equipment 25 is arranged in parallel to the vertical clamps 21 and 22, this slide equipment 25 will also be arranged in the slanting crossing direction to the direction of the board width of band steel 1. With this slide equipment 25, rotating said cutting edge 23, by making it reciprocate to the direction of the board width of band steel 1, along with the vertical clamps 21 and 22, the direction of the board width can be cut aslant, and the direction of board thickness can be aslant cut along the inclination of the side face of these vertical clamps 21 and 22 to coincidence. In this way, a slanting welding side can be formed in the direction of the board width and the direction of board thickness of band steel 1.

[0020] Therefore, the slanting welding side which ****s mutually can be formed in each edge by sending the back end section 11 of the band steel 1 preceded with this welding side formation part 20, and the front end section 12 of band steel 1' which carries out backward one by one.

[0021] Next, the band steel 1 and band steel which carries out backward 1' in which the slanting welding side which ****s mutually was formed and to precede are sent to the seam welding part 30 one by one.

[0022] This seam welding part 30 Between the backward clamp 32 for holding the precedence clamp 31 for holding the back end section 11 of the band steel 1 to precede, and the front end section 12 of band steel 1' which carries out backward, this precedence clamp 31, and the backward clamp 32 The electrodes 33 and 34 and this electrode of the vertical pair which contacts the welding side which was arranged and was compared are held, and it consists of an electrode maintenance arm 35 for moving an electrode along with a comparison part.

[0023] drawing 11 -- and -- drawing 12 -- being shown -- having -- as -- band steel -- one -- the back end -- the section -- 11 -- precedence -- a clamp -- 31 -- holding -- having -- **** -- band steel -- one -- the back end -- the section -- 11 -- welding -- a field -- backward -- carrying out -- band steel -- one -- ' -- the front end -- the section -- 12 -- welding -- a field -- comparing -- having -- this -- a condition -- backward -- carrying out -- band steel -- one -- ' -- the front end -- the section -- 12 -- backward -- a clamp -- 21 -- holding -- having . In the example of illustration, the welding side of band steel 1' which carries out backward to the bottom of the welding side of the band steel 1 to precede enters, and will be piled up. Seam welding is performed to this whole comparison part by being moved from the upper and lower sides by the electrode maintenance arm 35 along with the comparison parts of the welding side of the band steel 1 preceded by contacting electrodes 33 and 34, and the welding side of band steel 1' which carries out backward to this piled-up welding side. Electrodes 33 and 34 are pulled apart from the welded band steel 10 by the electrode maintenance arm 35 after seam welding termination.

[0024] The welded band steel 10 continues, and is sent to the welding after-treatment part 40, and cutting processing of the excessive edge protruded in the direction of the board width is performed. each which this welding after-treatment part 40 isolates these vertical rolls 41 and 42 in the direction of the board width including the vertical rolls 41 and 42 which sandwich band steel 10 from the upper and lower sides as shown in drawing 13 , respectively, and is arranged -- it consists of a roll of a pair. The upper roll 41 of a pair is isolated so that isolation spacing may turn into spacing equal to the board width of band steel 10. On the other hand, it is isolated and the roll 42 under a pair has roll width of face larger than the roll width of face of the upper roll 41 so that it may become spacing narrower than the board width of band steel 10. In this way, band steel 10 is laid in the inside one half of width of face, and the upper roll 41 of a pair is laid in the remaining outside one half. The finished product of the band steel 10

which only the excessive edge part pinched by the vertical rolls 41 and 42 was cut by passing the band steel 10 after welding, and was welded among these vertical rolls 41 and 42 is obtained (drawing 14).

[0025] Furthermore in the band steel relay welding process of this invention, the combination like a cutting process and a roll turner can also be used as said welding side formation process. The example in this case is shown in drawing 15 - drawing 18 . Since it is the same process as said example here except a welding side formation process, the same sign explains the same equipment and the same process.

[0026] As shown in drawing 15 , the welding side formation part 20 which performs a welding side formation process consists of a cut shear 26 and a reduction roll 50. A cut shear is easy to be the thing of common use, and uses the coil cut shear 26 here.

[0027] A reduction roll 50 consists of an upper roll 51 which has the rolling sections 53 and 54, respectively, and a bottom roll 52, as shown in drawing 16 . These rolling sections 53 and 54 consist of rod part material of the semicircle currently arranged in the part on the spherical surface of the vertical rolls 51 and 52, and in case the rolling roller 50 rotates, both rolling sections are arranged on the vertical roller 51 and 52, respectively so that it may not contact mutually. Here, in case the rolling section 53 of the upper roll 51 rolls out band steel so that clearly from drawing 16 , the rolling section 54 of the bottom roll 52 is located caudad, and does not touch band steel. After rolling of the band steel 1 to precede is performed, when a reduction roll half-rotates, rolling of band steel 1' which carries out backward will be performed.

[0028] Although it is the welding side formation approach in this case, as first shown in drawing 17 , the direction of the board width of the back end section 11 of the band steel 1 to precede and the front end section 12 of band steel 1' which carries out backward is cut by the cut shear 26 in the slanting crossing direction. Subsequently, as shown in drawing 18 R> 8, band steel is inserted into a reduction roll 50, and the direction of board thickness is rolled out aslant. If rolling of the back end section 11 of this band steel preceded in the case [band steel] is performed by the rolling section 53 of the upper roll 51, rolling of the front end section 12 of band steel which carries out backward will be performed by the rolling section 54 of the bottom roll 52. In this way, the back end section 11 and the front end section 12 are rolled out by the configuration which ****s mutually, and form the slanting welding side which ****s mutually.

[0029] Then, the finished product of the welded band steel is obtained through the above-mentioned seam welding process and a welding tail end process (drawing 5 R> 5 and drawing 6).

[0030]

[Effect of the Invention] According to the relay welding process of the band steel of this invention, since the slanting welding side which ****s mutually is formed in the back end section of the band steel to precede, and the front end section of band steel which carries out backward, the seam welding of this welding side can be compared and carried out to it. That is, the direction of board thickness of a welding side can be used as thin meat, by cutting or rolling out the direction of board thickness aslant, the direction of the board width is cut aslant, while comparing this welding side mutually, it can pile up, and seam welding becomes possible.

[0031] By welding by this seam welding, the weld time can be shortened, after treatment, such as bead processing, becomes unnecessary, a coil edge melts, and omission etc. can be prevented. Moreover, since the back end section and the front end section which carries out backward to precede are formed in the slanting welding side which ****s also in the direction of board thickness mutually, it is equal to the board thickness of band steel original. [of the board thickness of the part which this welding side piles up] Therefore, by the conventional approach, the board thickness of the part to pile up becomes thick too much, and the seam welding also of the galvanization ingredient for which seam welding was impossible becomes possible.

[0032] Furthermore, since the band steel relay approach of this invention is incorporable into Rhine as indicated in the example, even if it is not a skilled craftsman, relay welding can be performed easily.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is a top view explaining the conventional relay welding process.

[Drawing 2] Drawing 2 is a cross-sectional view explaining the conventional relay welding process.

[Drawing 3] Drawing 3 is the perspective view of the weld obtained by the conventional relay welding process.

[Drawing 4] Drawing 4 is a top view which a coil edge melts and explains omission.

[Drawing 5] Drawing 5 is the top view of the weld obtained by the band steel relay welding process of this invention.

[Drawing 6] Drawing 6 is the side elevation of the weld obtained by the band steel relay welding process of this invention.

[Drawing 7] Drawing 7 is the perspective view of the weld obtained by the band steel relay welding process of this invention.

[Drawing 8] Drawing 8 is this schematic drawing of one example which applied the band steel relay approach of this invention to roll formation Rhine etc.

[Drawing 9] Drawing 9 is a cross-sectional view explaining the cutting process of a welding side formation process.

[Drawing 10] Drawing 10 is a top view explaining the cutting process of a welding side formation process.

[Drawing 11] Drawing 11 is a top view explaining a seam welding process.

[Drawing 12] Drawing 12 is the cross-sectional view of drawing 11.

[Drawing 13] Drawing 13 is a cross-sectional view explaining edge processing of the welded band steel by welding after treatment.

[Drawing 14] Drawing 14 is a top view explaining the welding after-treatment part in a welding tail end process.

[Drawing 15] Drawing 15 is this schematic plan view showing another example of this invention.

[Drawing 16] Drawing 16 is the cross-sectional view of drawing 15.

[Drawing 17] Drawing 17 is the top view of the band steel which cut the direction of the board width in the slanting crossing direction.

[Drawing 18] Drawing 18 is a cross-sectional view which explains like a roll turner.

[Description of Notations]

1 1': Band steel

10: Welded band steel

11: The back end section of the band steel to precede

12: The front end section of the band steel which carries out backward

20: Welding side formation part

21: Upper clamp

22: Bottom clamp

23: Cutting edge

24: Support shaft
25: Slide equipment
26: Coil cut shear
30: Seam welding part
31: Precedence clamp
32: Backward clamp
33 34: Electrode
40: Welding after-treatment part
50: Rolling roller
51: Upper roller
52: Lower roller
53 54: Rolling section

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CLAIMS

[Claim(s)]

[Claim 1] band steel relay welding process: characterized by having the following process -- the seam welding process which compares the welding side formation process; this welding side which forms the slanting welding side which ****s mutually in the back end section of the band steel to precede, and the front end section of band steel which carries out backward, and carries out the seam welding of the comparison section to it.

[Claim 2] The band steel relay welding process of claim 1 characterized by equipping said welding side formation process with the cutting process which cuts aslant the direction of the board width and the direction of board thickness of band steel.

[Claim 3] The direction cutting process of the board width of cutting aslant the direction of the board width of band steel relay welding process: band steel of claim 1 where said welding side formation process is characterized by having the following process; it is a process the board thickness direct pressure total which performs rolling processing in the direction of board thickness of band steel.

[Claim 4] The band steel relay welding process of claim 3 characterized by cutting the direction of the board width of band steel acutely in said direction cutting process of the board width.

[Translation done.]